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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,444	01/14/2005	Steven T. Fink	264226US6YAPCT	8784

22850	7590	10/30/2007
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.		
1940 DUKE STREET		
ALEXANDRIA, VA 22314		

EXAMINER	
CHANDRA, SATISH	

ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
10/30/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.		Applicant(s)	
	10/521,444		FINK, STEVEN T.	
	Examiner		Art Unit	
	Satish Chandra		1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 44 - 69 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 44 - 69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/05, 7/07, 3/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 44, 48 – 53, 55, 56, 62 – 66, 68 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260).

Komino discloses a processing chamber (Fig 1) comprising:

Regarding claims 44, 48 – 53, 56 and 62 - 66, a processing vessel (chamber) PC having a lower wall (not labeled) and a side wall (not labeled) having a plurality of pumping ports (not labeled) disposed along the periphery of the floor separated from each other, symmetrically spaced about a chuck assembly 84, and each pumping port connected to a pump cell 88 (Fig 16, Column 14, lines 42 - 64).

Regarding claims 55 and 68, an upper electrode 93a (Fig 17) to facilitate the formation of plasma.

Komino does not disclose:

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Regarding claims 44 and 56, at least one pumping cell, integrally including a pump and a valve, coupled to a first pumping port.

Kawasaki et al disclose:

Regarding claims 44 and 56, a vacuum exhaust system wherein a valve drive mechanism 64 is provided integrally with the pump body. This valve device is capable of opening regulation, and this single valve device can concurrently function as an opening/closing valve and an opening regulating valve.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the pumping cell of Komino et al with the integrated pump and valve assembly of Kawasaki et al in the apparatus of Komino et al.

The motivation for replacing the pumping cell of Komino et al with the integrated pump and valve assembly of Kawasaki et al is to provide a pump and valve assembly so the exhaust system around the chamber can be constituted compactly as taught by Kawasaki et al.

Komino et al and Kawaskai et al do not disclose:

Regarding claims 44, 56 and 69, a seal coupled to the second pumping port and configured to block a gas flow through the second pumping port.

Wherein the pumping cell is removed from the first pumping port and a substitute seal is provided to the first pumping port, the substitute seal being configured to block a gas flow through the first pumping port .

Doan et al disclose:

Regarding claims 44, 56 and 69, Fig 1 depicting an embodiment whereby chamber 12 (Column 3, lines 58 – 67, Column 4, lines 1 – 7) is provided with multiple outlets 32 and 34, with one of said outlet 32 being in fluid communication with first vacuum pump 26 and another of said outlets 34 being in fluid communication with second vacuum pump 28 wherein pressure control valving or other apparatus could be associated with one or more of the illustrated pumps, outlets and/or conduits for controlling the pressure, or isolating one or more pumps from the chamber while one or more other pump(s) operate(s) relative to the chamber. Doan et al further disclose that isolating valve 42 is in the form of a pivotable flap valve 44 (Fig 2, Column 4, lines 21 – 24) and configured for selectively isolating the first and second pumps 26a and 28a respectively from fluid communication with conduit 40.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide valving on every flange in the apparatus of Komino et al and Kawasaki et al as taught by Doan et al.

The motivation for providing valving is to improve sealing capabilities in the apparatus of Komino et al and Kawasaki et al as taught by Doan et al.

Komino et al, Kawasaki et al and Doan et al do not disclose:

Regarding claims 44 and 56, when the seal is removed from the second pumping port and a substitute pumping cell is provided to the second pumping port such that a gas flow through the vacuum processing apparatus is reconfigured by providing the substitute seal to the first pumping port and providing the substitute pumping cell to the second pumping port.

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Makino et al disclose:

Regarding claims 44 and 56, in the first to third preferred embodiments (Column 5, lines 56 – 67), the exhaust pump 18 is provided (Fig 6) on one side-wall of the vacuum processing chamber. This location of the exhaust pump will cause a deviation of gas flow upon evacuation of the chamber. To cope with this deviation, a pair of exhaust pumps (Fig 7) 42 may be provided on the opposite lower side walls of a vacuum processing chamber 41, so as to eliminate the deviation of gas flow upon evacuation (Column 6, lines 1- 6) of the chamber 41.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reconfigure the gas flow when a seal is provided to the first pumping port and a pumping cell is provided to the second pumping port in the apparatus of Komino et al, Kawasaki et al and Doan et al as taught by Makino et al.

The motivation for reconfiguring the gas flow when a seal is provided to the first pumping port and a pumping cell is provided to the second pumping port in the apparatus of Komino et al, Kawasaki et al and Doan et al is to provide a different gas flow direction to optimize the apparatus of Komino et al, Kawasaki et al and Doan et al.

Claims 45 – 47 and 57 – 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260) as discussed in claims 44, 48 – 53, 55, 56, 62 – 66, 68 and 69 above and further in view of Dandl et al (US 2001/0016166) and Os et al (US 6,178,918).

Komino, Kawasaki et al, Doan et al and Makino et al do not disclose:

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Regarding claims 45 and 57, the side-wall has a height of at most about four inches.

Regarding claims 46, 47, 58 and 59, process chamber is made of a plate stock of aluminum having a thickness of about four inches.

Dandl et al discloses:

Regarding claims 45 and 57, the vertical height of the space between a substrate and a partition wall 4 is of the order of 10.2 cm (about 4 inches, Para 0124, Fig 1).

Os et al disclose:

Regarding claims 46, 47, 58 and 59, a cylindrical process chamber made of aluminum.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the vertical height of the side wall about four inches; make the process chamber from stock of aluminum in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Dandl et al and Os et al respectively.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the process chamber from plate stock of aluminum of four inches thick in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al.

The motivation to provide a side wall with a height of about four inches is to optimize the size of the process chamber in order to minimize fabrication and other costs in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al.

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The motivation for making the process chamber from a single stock of aluminum plate is again to minimize fabrication costs in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al.

The motivation for making the process chamber from plate stock of aluminum of four inch thick in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al is to optimize the thickness of the processing chamber.

Claims 54 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260) as discussed in claims 44, 48 – 53, 55, 56, 62 – 66, 68 and 69 above and further in view of Carducci et al (US 2003/0038111).

Komino, Kawasaki et al, Doan et al and Makino et al do not disclose:

Regarding claims 54, the process chamber is configured to have a chamber liner configured to reduce the open volume within the process chamber.

Carducci et al discloses:

Regarding claims 54 and 67, chamber liner 104 is disposed as a first liner 134, a second liner 118 and the lid liner 104 (Para 0056) adjacent to walls 106, 108 and the lid 102.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to install a liner in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Carducci et al respectively.

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The motivation to provide a liner in the process chamber is to prevent the plasma gases from attacking the process chamber walls in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Carducci et al.

Claims 60 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260) as discussed above in claims 44, 48 – 53, 55, 56, 62 – 66, 68 and 69 and further in view of Ishii (US 5,685,942).

Komino, Kawasaki et al, Doan et al and Makino et al do not disclose:

Regarding claim 60, the step of making the process chamber comprises a molding process.

Regarding claim 61, the lower wall is a plate and the side-wall is a rolled cylinder which is welded into the plate.

Ishii discloses:

Regarding claim 60, a plasma etching equipment 1 (Fig1) includes a processing housing 2 molded into a circular cylinder or a rectangular cylinder out of conducting material such as aluminum (Column 3, lines 30 – 35).

Regarding claim 61, it is well known in the art that two pieces can be joined together by welding.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a molding process for fabricating a process chamber in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Ishii.

The motivation for using a molding process for fabricating a process chamber is to provide an alternate and equivalent means of fabricating process chambers as taught by Ishii.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satish Chandra whose telephone number is 571-272-3769. The examiner can normally be reached on 8 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, Primary Examiner, Ram Kackar can be reached on 571-272-1436. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Satish Chandra


Ram Kackar
Primary Examiner